



UNIVERSITY OF GONDAR

COLLEGE OF MEDICINE AND HEALTH SCIENCES

INSTITUTE OF PUBLIC HEALTH

**DEPARTMENT OF HEALTH SERVICE MANAGEMENT AND HEALTH
ECONOMICS**

**Improving Physical Examination in the Central Triage at Outpatient
Department, University of Gondar Comprehensive Specialized
Hospital, Northwest Ethiopia, 2017**

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Abbreviations

AIDS	Acquired Immunodeficiency Syndrome
CEO	Chief Executive Officer
CT	Central Triage
EHRIG	Ethiopian Hospital Reform Implementation Guideline
ER	Emergency Room
ETAT	Emergency Triage and Treatment
GUH	Gondar University Hospital
HIV	Human Immunodeficiency Virus
HSE	Health Service Executive
IRB	Institutional Review Board
MR	Medical Record
OPD	Outpatient Department
PHC	Public Health Collage
PI	Principal Investigator
SMR	Senior Management Team
TB	Tuberculosis
TC	Training Center
TTP	Team Training Program
UoGCSH	University of Gondar Comprehensive Specialized Hospital

Abstract

Introduction: The baseline assessment in this study showed that the implementation of Central Triage physical examination procedure was too low In Outpatient Department at University of Gondar Comprehensive Specialized Hospital.

Objectives: To increase the proportion of patients physical examining procedures from 1.1% to 40 % in the Central Triage at Outpatient Department at UoGCSH, by the end of January / 2017.

Method: A facility based pre- post interventional study was conducted from March/2016 to January/2017 in the University of Gondar Comprehensive Specialize Hospital, Ethiopia The interventions included 1) Training of Central Triage health personnel and other multi disciplinary concerned department heads 2) Establish and availing policy supported Central Triage protocol 3) Accelerate scale-up best experience from similar hospital 4) Fulfill requirement of medical equipment and furniture 5) Strengthening internal supportive supervision. The sample consisted of 267 patients' medical record review and observations of patients who got appropriate Physical Examination by using simple random sampling techniques. Independent T- Test used to compare the difference in the outcome of interest between the pre – and post –intervention periods with equal sample size and the same variable.

Results: The percentage of physical examination, measurement of vital sign, quick problem oriented system examination and linkage of emergency patient from Central Triage to Emergency Room showed an improvement from 1.1% to 43.4%, 1.4% to 47.5%, 4.3 to 39.1% and 1.4% to 11.6% respectively. Intervention results established and make availing policy supported Central Triage protocol, and percentage of medical equipment and furniture and CT standards showed an improvement from 11.8% to 76.5 %.and 40% to 80 % respectively,(P value.<05).

Conclusion: Establish and availing organizational Central Triage protocol and resources based on national standards and hospital context, resulted in improving physical examination.

Recommendations: Continuous internal Supportive Supervision of health personals followed by on job training related to protocol can improve the implementation of physical examination.

1. Introduction

1.1. Organizational Description

The current University of Gondar Comprehensive Specialized Hospital Serves for more than 5 million population for outpatient and inpatient, maternity and child health care, Anti-natal and FP, the chronic illness, HIV/ADS, TB infection of their related problem, kalazar project, fistula, ophthalmology, TTP program and research activities, In addition to the hospital services, through TTP programs CMHS is providing outreach health services for about 70,000 households in five sites (Debank, Dabat, Koladeba, Addis Zemen and Woreta), (15).

Currently it is constructing G+5 Maternal and Child care, best standard TB ward and laboratory, G+2 eye hospital and Fistula center, and general hospital that can give all other health services.

Table 1: Human resources, Health Services offered and other Relevant Information of UoG Comprehensive Specialized Hospital, Gondar, Northwest Ethiopia, January, 2016

Description	Number
Physicians	41
Nurses	428
Other health professional	340
Administrative staff	564
Outpatient visits per year	72142
Inpatient services per year	27975
Emergency department visits	2751
Delivery per year	5821
Number of beds	550
Average Length of Stay	5days

Central Triage is one of the Outpatient services that require various inputs including staffed with appropriately trained personnel and equipped with necessary equipment and supplies, infrastructure, standards and protocols. Properly designed and appropriate physical examination of patient in central triage was reducing patient waiting times, increase provider efficiency and staff and client satisfaction as well as to improve overall quality of care, (1, 8, 14).

1.2 Statement of the Problem

Four main service processes are described in the hospital: emergency, outpatient, inpatient and delivery services. Central Triage is the first point of patient contact in outpatient service which involves immediate evaluation of the patients' and the prioritizing of their care following a brief clinical assessment.(2) which should be open during regular working hours. The first step in Central Triage activity is to assess and treat emergency signs, following the adult and pediatric ETAT protocols. The Triage Officer should identify patients who would be more appropriately treated by the emergency case team, if the patient does not have an emergency condition, the Triage Officer should then determine the nature and urgency of the client's medical problem and determine the appropriate service/case team required by the patient. If the service is not available in the hospital then a referral should be made to another facility. (8)

Central Triage service is complained by many of the clients and hospital departments that have directly link with it /ER of OPD and different OPD department. (There is incomplete physical examination, shortage of human resources, incomplete medical equipment, has no Triage protocols and standard, lack clinical staff training, high patient flow, small size examination room and poor internal infrastructures and facilities).

Table 2: Base line assessment of Ethiopian Hospital Reform Implementation Guide
Line Central Triage standards

Sr.N o.	Standards	pre- intervention		post-intervention	
		Met	Unmet	Met	Unmet
1	The hospital has a Central Triage	√			
2	Has established Central Triage protocol		√		
3	Has Central Triage partition room		√		
4	Has Central Triage clinical health personnel		√		
5	Has Central Triage trained clinical health personnel's		√		
6	Central Triage equipped with necessary equipment and supplies		√		
7	All patients (except laboring mothers, patients with an appointment for an outpatient clinic or admission) undergo triage	√			
8	Central Triage near to emergency triage		√		
9	Central Triage near to medical recorded room	√			
10	Has Central Triage enough patient waiting area	√			
total		4			
%		40%	60%		

The following problems were identified through observation and recorded review with Information and Statistics Officer, Quality Officer, Hospital administration head, Medical record management head and CT health professionals:

1. Long waiting time of OPD patients 131.5 minutes
2. Staff satisfaction 46%
3. OPD patient's satisfaction 74%
4. Physical examination at Central Triage 1.4 %, (16).

The first three has a recent study results in the Hospitals, but we selected clinical assessment Central Triage because it is over all health importance in the hospital, by using the of problem prioritization matrix and other feasibility criteria, (3, 8). The tool includes the following elements for a physical examination of all clients who visited the Central Triage department, these are:

- vital signs
 - ✓ Blood pressure
 - ✓ Temperature
 - ✓ Pulse rate
- ✓ Respiration rate
- Quick problem oriented system examination

The investigator tried to observe the clinician in charge during physical examination all triage clients reach to sample size. To measure this magnitude the investigator developed an observation check list based on EHRIG.

.

1.2.1 Measuring the Magnitude of the Problem

The proportion of client who got appropriate physical examination to total number of client who visited Central Triage OPD at University of Gondar Comprehensive Specialized Hospital from March 20/2016-25/2016 was the indicator to measure the magnitude of the problem.

Table 3. Problem Prioritized University of Gondar Comprehensive Specialized Hospital. 2016.

	Problem Impact: Small	Problem Impact: Moderate	Problem Impact: Big
Problem is rare			
Problem is common		Low OPD patient satisfaction,74%	Low staff satisfaction,46%
Problem is constant		Long waiting time of OPD patients 131.5 minute	Poor quality of physical examination at central triage 1.1 %, studied

Aim:

The aim of this capstone project was to identify whether client assessment in the central triage is according to the Central Triage protocol and standards or not and to improve client physical assessment of the Central Triage.

1.3. Literature Review

Effective resource allocation and capacity planning are contingent upon patient flow because patient flow, in the aggregate, is equivalent to the demand for health care services. (1)

South Africa implementation of an emergency unit triage system in a selected private hospital core competencies required of the nurse in the triage process:- System examination 20% Taking of a good medical history 67%, Taking vital signs 80% determine general appearance 73%, and incorrect decisions about those patients 53% of the respondents. Hospitals should centralize a triaging location, preferably near the Emergency Room (ER) in order to avoid unnecessary patient crowding. (2)

In Sweden an effective triage-nurse is dependent on three basic proficiencies:

- The capacity to estimate conditions from a short clinical history taking, clinical measurements and a quick problem-orientated system examination.
- Comprehensive knowledge of serious injuries as well as a broad knowledge of pathological presentations.
- Intuition developed through long-time experiences, which helps decide the patient's actual condition.(4)

In Ireland Triage involves immediate evaluation of the patients' condition and the prioritizing of their care following a brief clinical assessment, (9)

Stronger scientific evidence is needed to determine which of the vital signs and chief complaints have the greatest prognostic value in triage (10)

Triage in Saudi Arabia, Triage, applied strictly using standard principles in EDs, psychiatric settings and health disaster situations, remains a complex issue.

Primary and secondary decisions by triage nurses and physicians and related health outcomes are influenced by a variety of internal factors related to triage personnel and external factors related to the operational mechanisms, (6)

Present-day triage has improved but not to the extent that is required for best practice. Triage tool has had considerable benefits in the assessment of patients, (10).

Central Triage should be open during regular working hours. The first step in Central Triage activity is to assess and treat emergency signs, following the adult and pediatric ETAT protocols, (8, and 14).

The study showed that information was less accurate after implementation of the protocol (56.6% before versus 49.2% after), (11), standards for patient flow increased from before implementation 23% to after implantation 85%,(8, 13).Central had triage ten standards it supported Ethiopia hospital guideline, (8, 14).

1.4. Root cause analysis

Following identification and prioritization of the major problems of the study health institutions, it was conducted group discussion with University of Gondar Comprehensive Specialized Hospital administer head, Information and Statistics Office, Quality Office, Hospital management team, and Medical record management Head. Observation and checklist to explore the possible root causes of low status of physical examination procedure all patients sorting at Central Triage. During the discussion 9 reasons were forwarded such as lack of Central Triage protocol, lack of medical equipment and supply and furniture, lack of central triage clinical staff , lack of trained central triage clinical staff, poor knowledge about central triage, small size central triage room, lack of portion room, negligence, budget short fall. Root causes analysis using fish bone diagram and were put under four major categories in the fish bone diagram.

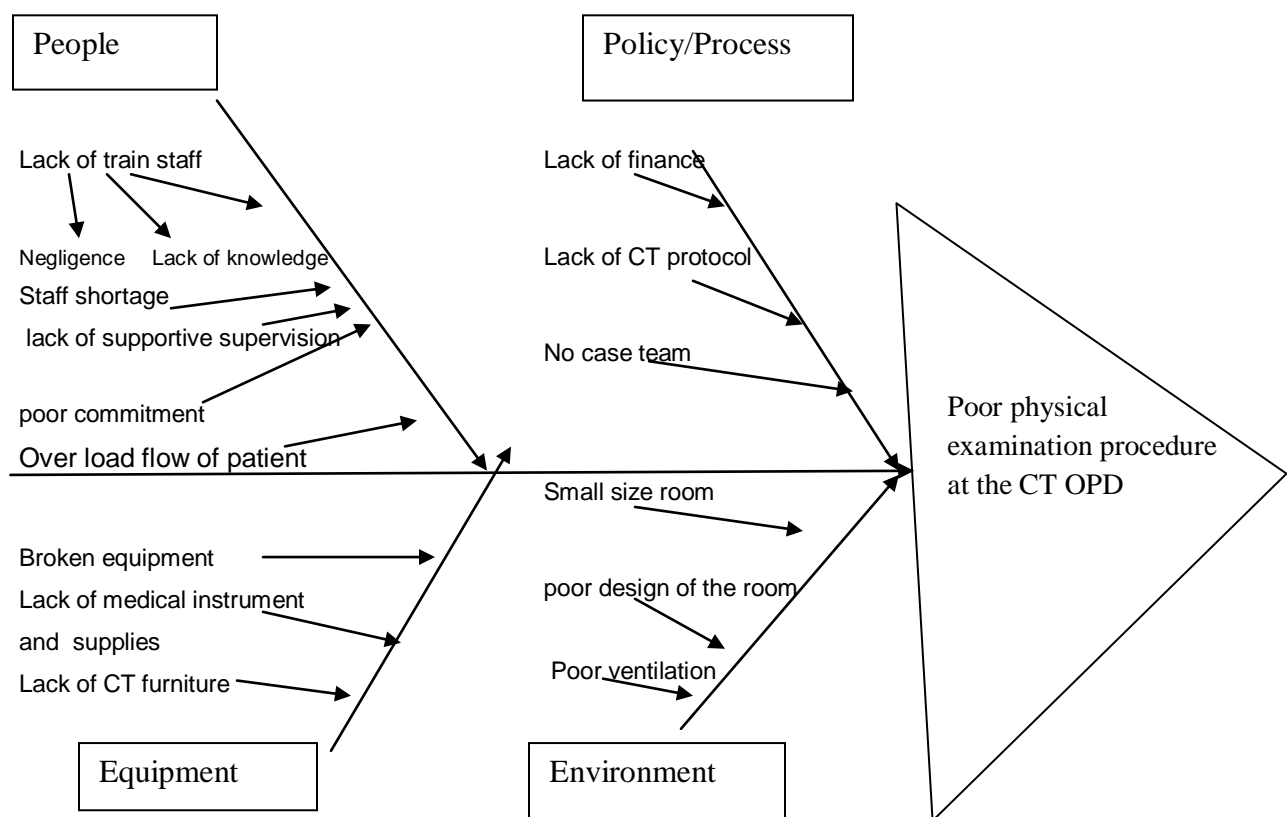


Figure 1. Fishbone Analysis showing the result of observation held to identify the possible causes of under Standardized Physical Examining Procedure at the Specialized Hospital, Northwest Ethiopia, March, 2016.

Major Root Cause

It is well documented that fishbone does not tell the major cause of the problem so it needs further analysis in order to know the major cause of the problem. Therefore, through discussion where conducted with key stakeholders mentioned above selected major causes are:-

- ✓ Lack of Central Triage standard and protocol
- ✓ Lack of Central Triage medical equipment and supply and furniture
- ✓ Lack of Central Triage clinical staffs
- ✓ Lack of Central Triage trained clinical staffs

1.5. Justification

Through pre-intervention study of Central Triage in the OPD low percentage of patient's physical examination, CT standard and equipment and supply and furniture result shows 1.1%, 11.8% and 40% respectively..Because of in CT there is no clear guidelines and protocol about central triage activities. As to the knowledge of the investigator, there are limitations of studies on the issue of physical examination in the Central Triage at OPD.

Improving physical examination could have public health importance and helps to generate and provide evidence based information for policy makers, program planners and health service providers on the problem which subsequently help to design and implement appropriate intervention mechanisms. It can reduce patient waiting times, increase provider efficiency to see and treat patients, appropriate linkage of patient, increase both patient and staff satisfaction, and improve overall quality of care.

1.6. Objectives

1.6.1. General Objective

- To increase the proportion of patients physical examining procedures from 1.1% to 40 % in the Central Triage at Outpatient Department at UoGCSH, by the end of January / 2017.

1.6.2. Specific Objectives

- To increase the proportion of patients vital sign measurement from 1.4 % to 40 % in the Central Triage at Outpatient Department at UoGCSH, the end of January 2017.
- To increase the proportion of patients quick problem oriented system examining procedures 4.3% to 40 % in the Central Triage at OPD of UoGCSH, by the end of January / 2017.
- To improve the proportion of emergency patient linkage to Emergency Triage OPD from 1.4% 10%. by the end of January /2017.

2. Methods

2.1. Study Area

The study was conducted at University of Gondar Comprehensive Specialized Hospital in Central Triage at Outpatient Department. Geographically it is located in Gondar city administrative, North Gondar Zone; Hospital is currently providing a service for more than 7 million people of the catchment area with varying climatic and geographical distribution. Central Triage is one of the outpatient service delivery sites where sorting patients to determine the appropriate service required by the patient for all clients. The hospital delivers the services 72142 patients at outpatient and 45078 patients at CT per year.

2.2. Study Design and Period

Institutional based pre intervention study was conducted from March 10 to 29/2016 and after six month of intervention implementation post-intervention study was conducted from January 13-30 /2017 to met CT standards, CT medical equipment and supply and furniture supported EHRIG and Improve Physical Examination in the Central Triage and lineage of emergency patient to ER at Outpatient Department University of Gondar Comprehensive Specialized Hospital.

2.3. Source Population and Study Population

2.3.1. Source Population

All records of the patient who got Physical Examination at Central Triage in University of Gondar Comprehensive Specialized Hospital.

2.3.2. Study Population

All records of the patient who got Physical Examination at Central Triage during March/2016 to January / 2017, in University of Gondar Comprehensive Specialized Hospital during pre and post intervention period.

2.4. Inclusion and Exclusion Criteria

2.4.1. Inclusion Criteria

All records of patient who got Physical Examination procedure at Central Triage during March to January / 2016

2.4.2. Exclusion Criteria

- Emergency cases (should immediately attend emergency department),
- Laboring mothers (should immediately attend delivery unit),
- Those with an appointment (should immediately go to relevant case team.
- Neonate.

2.5. Sample Size and Sampling Procedures

2.5.1. Sample Size Determination

- Sample size was calculated by using single population proportion formula.

Assumptions;

Z = standardized normal distribution value at the 95% CL, which is 1.96

P=50%

w = the margin of error, taken as 5%

$$n = \frac{\left((z^{\alpha/2})^2 \times p(1-p) \right)}{(d)^2}$$

$$n = (1.96*1.96)*0.5(1-0.5)/0.0025 = 384$$

n = the number of patient observing for the study will be 384.

But sample size was large related to time and resources, and total population is < 10,000. So correction by Sample size adjustment formula = $n/1+n/N$ [2]

n=number of sample size

N=number of total population

= $384/1 + (384/969) = 384/1.39 = 276$, used the equal sample size in pre and post intervention

2.5.2. Sampling Procedure

A systematic random sampling was used to select the study participants. The sampling interval was determined based on the number of patients who came for sorting at Central Triage OPD. The average total number of patients who came to Central Triage OPD for sorting in two weeks was estimated to be 969. By considering weekly patients come for sorting, the sampling interval was

$$K = N/n = 969/276 = 3.48 = 3$$

- ❖ randomly select an integer between 1 to k = 1 to 3 = 2

- ❖ Start the second patient then take every 3rd patient until sample size equals 276, and will use the same sample size and procedure for post intervention.

2.6. Data Collection Procedures

Data were collected through observation, group discussions; checklists and patient record review. Data were collected from Central Triage room in which medical service was provided using checklist designed to collect the intended data by record review of the patient in the study health institutions on regular working hours. Each study subject was given identification code. Pre and post data collection sample size was equal with the same variable. It avoids possible biases. The record review questioner was first prepared in English, then translated into Amharic, and then translated back to English to check its consistency, and trained three data collector to the study. Group discussion was made with 18 OPD members to identify major root causes. Researcher was direct observing Triage health personnel sorting of patient and link to Emergency Room.

2.7. Measuring the Magnitude of the Problem

The percentage of client who got appropriate physical examination to total number of client who visited Central Triage OPD, and compare with pre and post intervention at University of Gondar Comprehensive Specialized Hospital during the study of period .

2.8. Data Analysis

To assess the overall percentage of the records patient who got Physical Examination procedure.

Implementation Procured were supported by EHRIG was calculated for both pre and post–intervention groups. Implementation status assessed for each 5 components of the physical examination. Data was coded and entered using EPI INFO version7 and analyzed using SPSS version 20.Independent T-test used to test the difference in the outcome of interest before and after intervention.

2.9. Operational Definition

Improved physical examination:-A patient who got appropriate physical examination out of major physical examination components such as measurement of temperature,

blood pressure, pulse rate respiration rate and quick problem oriented system examination.

Physical examination was measured using the ERHIG and Core competencies tool which has 5 major variables we say good Vital sign measured / if >3 (60%) of components and poor Vital sign measured / if ≤3 (60%) of components

Vital sign components: such as measurement of temperature, blood pressure, pulse rate respiration rate

Vital sign was measured using the ERHIG and Core competencies tool which has 4 major variables we say good Vital sign measured / if >2 (50%) of components and poor Vital sign measured / if ≤2 (50%) of components

Quick problem oriented system examination was measured using the Core competencies tool measured if ≥ 20% we say good, and if <20 % poor (2)

Clinical staffs are General Practitioner or Health Officer or B. Sc. Nurse that are working in the CT.

Trained clinical staffs are all clinical staffs working in the CT with appropriately trained personnel about CT activities.

Core competencies is area of expertise fundamental to job: an area of expertise that is fundamental to a particular job or function

2.10. Variables

2.10.1. Dependent variable

- Improving Physical Examination /%/

2.11.2. Independent variable

Environmental and Medical related causes

- Access of CT protocol and standard
- Examination room partition or screening
- Available medical equipment and furniture in the room

Individual related causes

- Number of health professional
- Trained health professional
- Supportive supervision and monitoring

2.11. Ethical Considerations

Ethical clearance obtained from the Institutional Review Board (IRB) of IPH, College of Medicine and Health Sciences, University of Gondar. Additional support letter will be obtained from the University of Gondar Comprehensive Specialized Hospital. The patients and health professionals who participated in the study were guaranteed confidentiality and anonymity.

3. Intervention

Selected major root cause

- Lack of Central Triage standard and protocol
- Lack of Central Triage medical equipment and supply and furniture
- Lack of Central Triage clinical staff
- Lack of Central Triage trained CT clinical staff

Table 4. Comparative analysis for possible interventions

1. Lack of Central Triage protocol						
S/N	Alternative solutions /option	Feasibility	Time	Cost	Impact	Total
1	Establish and make availing Central Triage protocol based EHRIGL/200,2016/	3	4	4	4	15
2	Establish and make availing Central Triage protocol based on context Hospital and EHRIGL/200, 2016/.	5	4	4	5	18
3	Establish and make availing Central Triage protocol based on context Hospital	4	4	4	3	15
4	Strengthening interventions needed to accelerate scale-up from other similar hospitals	5	3	3	5	16
2. Lack of Central Triage medical equipment and supply and furniture						
S/N	Alternative solutions/option	Feasibility	Time	Cost	Impact	Total
1	Availing Central Triage medical equipment supply and furniture based EHRIGL/200,2016/	4	4	4	4	16
2	Availing Central Triage medical equipment supply and furniture based on context Hospital and EHRIGL/200, 2016/.	5	4	4	5	18
3	Availing Central Triage medical equipment supply and furniture based on context Hospital	4	4	4	3	15
3. Lack of Central Triage clinical staff						
S/N	Alternative solutions /option	Feasibility	Time	Cost	Impact	Total
1	Availing Central Triage clinical staff based EHRIGL/200,2016/	4	4	4	4	16
2	Availing Central Triage clinical staff based on context Hospital and EHRIGL/200, 2016/.	5	4	4	5	18
3	Availing Central Triage clinical staff based on context Hospital	4	4	4	3	15
4.Lack of Central Triage trained CT clinical staff						
S/N	Alternative solutions /option	Feasibility	Time	Cost	Impact	Total
1	Central Triage trained clinical staff based EHRIGL/200,2016/	4	4	4	3	15
2	Central Triage trained clinical staff based on context Hospital and EHRIGL/200, 2016/.	5	4	4	5	18
3	Central Triage trained clinical staff based on context Hospital	4	4	4	3	15
4	Internal supportive supervision and monitoring and evaluation	4	4	4	5	17

3.1 Selected best intervention

The multi disciplinary concerned department head listed alternative interventions and evaluated each intervention based on five Evaluative Criteria. One of the benefits of multi disciplinary concerned department head is that members will bring different perspective and knowledge about problems, their underlying causes and potential solutions. Based on the result of comparative analysis the best strategies were:-

- Establish and make availing Central Triage protocol based on context Hospital and EHRIGL/200, 2016/.
- Strengthening interventions needed to accelerate scale-up from other similar hospitals
- Availing Central Triage medical equipment supply and furniture based on context Hospital and EHRIGL/200, 2016/.
- Availing Central Triage clinical staff based on context Hospital and EHRIGL/200, 2016/.
- Trained Central Triage clinical staff based on context Hospital and EHRIGL/200, 2016/.
- Internal supportive supervision and monitoring and evaluation

Intervention1: Establish and make availing Central Triage protocol based on context Hospital and EHRIGL/2010, 2016/.

Discuss with multi disciplinary concerned department head to establish CT protocol according the context of University of Gondar comprehensive specialized hospital. Hospital need to establish and make availing Central Triage protocol to plan quality improvement interventions. One of the benefits of multi disciplinary concerned department head is that members will bring different perspective and knowledge about problems and root cause. Therefore, University of Gondar comprehensive specialized hospital has planned to form multi disciplinary department head. Then PI shared best experience from similar hospital and different literature review, to established CT protocol and approved by hospital management committee then availing Central Triage and quality officer room after training. It is important to include CT standards.

Table 5. Compliance of EHRIG Central Triage standards pre-post intervention in University of Gondar Comprehensive Specialized Hospital, Northwest Ethiopia, 2017

Sr.N o.	Standards	pre- intervention		post- intervention	
		Met	Unmet	Met	Unmet
1	The hospital has a Central Triage	√		√	
2	Has established Central Triage protocol		√	√	
3	Has Central Triage partition room		√		√
4	Has Central Triage clinical health personnel		√	√	
5	Has Central Triage trained clinical health personnel's		√	√	
6	Central Triage equipped with necessary equipment and supplies		√	√	
7	All patients (except laboring mothers, patients with an appointment for an outpatient clinic or admission) undergo triage	√		√	
8	Central Triage near to emergency triage		√		√
9	Central Triage near to medical recorded room	√		√	
10	Has Central Triage enough patient waiting area	√		√	
total		4	6	8	2
%		40%	60%	80%	20%

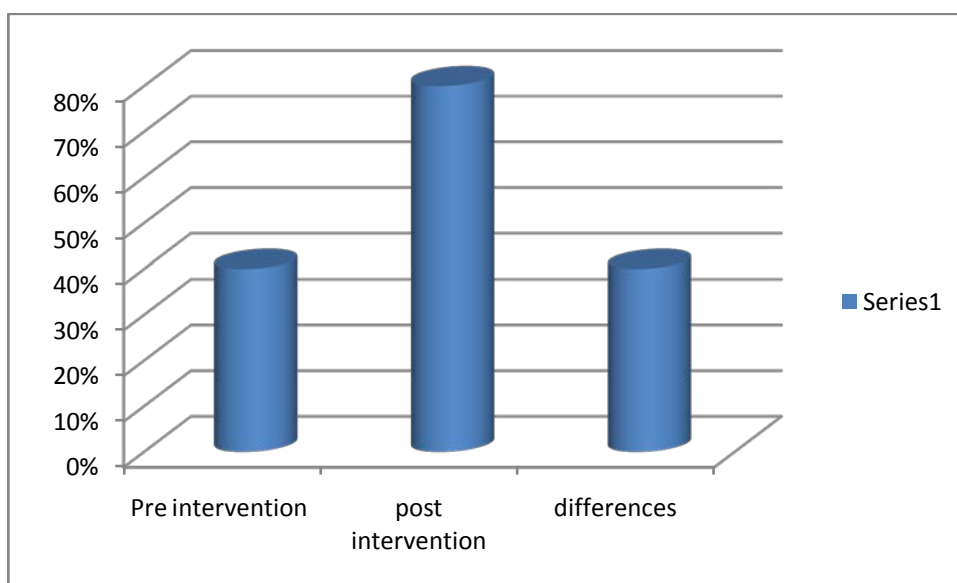


Figure 2. Compliance of EHRIG Central Triage standards pre-post intervention in University of Gondar Comprehensive Specialized Hospital, Northwest Ethiopia, 2017

Intervention2: Increases Central Triage clinical staff based on context Hospital and EHRIGL/2010, 2016/.

- ✓ Hospital increases health personals from one health officer to three health officer

Intervention3: Provision of onsite training for CT triage officers

To provide by quality officer and PI in health care institution all CT triage clinical staff should be trained to conduct triage assessment and treatment emergency sign, following the established triage protocols those are:-.

- **CT case management path**

Patients will be directed to Central Triage from the reception service (or Emergency Department). Within Central Triage, the patient will undergo a triage assessment.

- **Central Triage Activity**

Central Triage should be open during regular working hours. All patients should undergo Central Triage Except:

- Emergency cases (should immediately attend emergency department),
- Labouring mothers (should immediately attend delivery unit),
- Those with an appointment (should immediately go to relevant case team), and
- Neonate

. Activity is take a full history and examine the patient and treat emergency signs

- **Central Triage care management Human resource needs**

The Central Triage Case Team consists of both clinical and non-clinical staff, with appropriately trained personnel. Triage should be carried out by General Practitioner. However, depending on the availability of human resources, Health Officer or BSc Nurse could conduct triage for patients attending the outpatient department.

- **Central Triage equipment, furniture and supply** needs. Each triage and treatment room should be equipped with equipment and supply needed to provide care

- **CT working hour**

- **Clinical assessment for**

Intervention4:- Availing Central Triage medical equipment supply and furniture based on context Hospital and EHRIGL/200, 2016/.

Table 6. Medical equipment and supply and furniture policy supported of central triage at OPD of University of Gondar Comprehensive Specialized Hospital, Northwest Ethiopia, 2017

Sr.N o.	Item	PRE-INT		POST-INT	
		Yes	No	Yes	No
1	There is room furniture	√		√	
2	There is examination bed		√	√	
3	There is thermometer		√	√	
4	There is adult stethoscope		√	√	
5	There is adult sphygmomanometer		√	√	
6	There is adult weightscale		√	√	
7	There is electrocardiogram (ECG)		√		√
8	There is pulseoximetry		√		√
9	There is wheelchair		√	√	
10	There is stretcher		√	√	
11	There is gloves 1box	√		√	
12	There is face masks/box/		√	√	
13	There is microphone		√		√
14	There is antiseptic solution1botl		√	√	
15	There is wall clock(s)		√		√
16	there is partition/screening of examination and treatment room		√	√	
17	there is established Central Triage protocol		√	√	
total		2	15	13	4
%		11.8%	88.2%	76.5%	23.5%

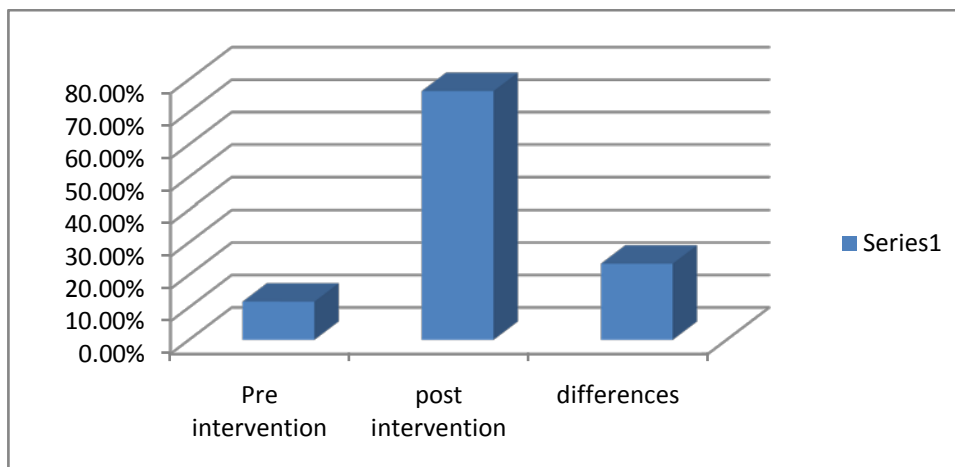


Figure 3. Medical equipment and supply and furniture policy supported of central triage at OPD of University of Gondar Comprehensive Specialized Hospital, Northwest Ethiopia, 2017

Intervention5: Internal supportive supervision and monitoring and evaluation

A close follows up and supportive supervision of the implementation of Central Triage activities has been made by the Medical Record management head during the working hours. In addition, the progress of implementation of Central Triage activities has been reviewed every month by the Medical Record management and OPD head.

Intervention6: Strengthening interventions needed to accelerate scale-up from other similar hospitals

Accelerate scale-up best experience from similar hospital about CT activities /Felege Hiwot referral hospital, Bahir Dare and Paulo;s Hospital, Addis Aababa/

3.2. Implementation accomplishments.

As part of this project, the following results were accomplished.

Established and availing CT protocols according to the context of University of Gondar comprehensive specialized hospital and (EHRIG,2010 and EHSTG,2016).Based on the implementation plan different departments head establish CT protocol, after establish CT protocol and **approved it by hospital management committee** procedures were established to ensure efficient Central Triage activities by fulfillment. Post intervention assessment was by patient with table and chair.

It seek to improve physical examination activities, directly link with it, reduce patient wait times, increase provider efficiency to see and treat patients, increase both patient and staff satisfaction, and improve overall quality of care.

2. Onsite Training

Short on site training on the Central Triage case management pathway, care management activity, and case management human resource needs and case management equipment and supply needs were given for Central Triage officers. The 2 days training /group discussion was given to 3 CT staff members and other 12 different department head by trained health personnel.

3. Internal Supportive Supervision

Assessment the progress of implementation of the CT has been reviewed every month by hospital information and statistic officer, quality officer and the medical record OPD head of the hospital.

4. Results

Intervention results established and make availing policy supported Central Triage protocol, and a total of 10 standards were included in this capstone project both in the pre and post intervention. During the intervention period the improvement of Central Triage standards were in July August/2016 40 % to 60% (6 standards met), and January /2017 from 60 to 80 % (8 standard met). A major improvement has been achieved each passing month. /see table-5/

A total of 17 Medical equipment and supply and furniture were included in this capstone project both in the pre and post intervention. During the intervention period the improvement of Central Triage Medical equipment and supply and furniture based on EHRIG supported were in August /2016 from 11.8% to 23.5 % (4 medical equipment), and September from 23,5 % to 76.5 % (13 medical equipment). A major improvement has been achieved each passing month. / See table 6/

Table 7. Physical examination procedure central triage at OPD of University of Gondar Comprehensive Specialized Hospital, Northwest Ethiopia, 2017

S.No.	physical examination Components		Central Triage N (%)	
			Pre-Intervention (N=276)	Post-Intervention (N=276)
1	sex	female	167(60.5%)	164(59.4%)
		male	109(39.5%)	112(40.6%)
2	age	<15years	77(27.9%)	72(26.1%)
		>15years	179(72.1%)	
3	Vital sign			
	Blood pressure measurement		2(1.4%)	127(46%)
	Temperature measurement		3(1.8%)	116(42%)
	Pulse rate measurement		6(2.2%)	120(42.5%)
	Respiration rate measurement		6(2.2%)	114(41.3%)
4	Quick problem oriented system examination		12(4.3%)	108(39.1%)
5	Link to emergency OPD		4(1.4%)	32(11.6%)
6	scale measurement physical examination		3(1.1%)	119(43.1%)
7	scale measurement of vital sign		4(1.4%)	131(47.5%)

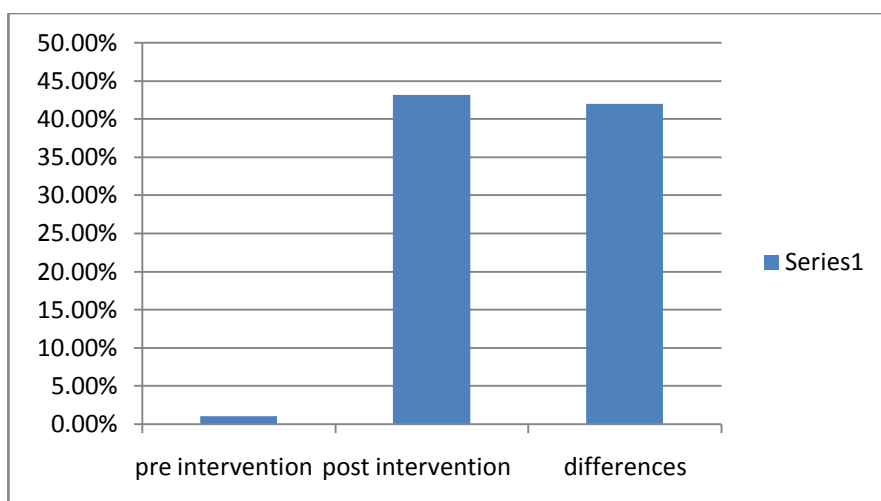


Figure 4 . Scale measurement of physical examination at central triage sorting patients at OPD University of Gondar comprehensive specialized Hospital, 2016/2017.

The analysis of data from the baseline regarding percentage of physical examination measurement of vital sign, quick problem oriented system examination and linkage of emergency patient from CT to ER CT showed an improvement from 1.4% to 47.5%, 4.3 to 39.1% and 1.4% to 11.6% respectively, and scale measurement of physical examination and measurement of vital sign showed an improvement from 3% to 43.1% and 4% to 47.5% respectively. Intervention results established and make availing policy supported Central Triage protocol, and percentage of medical equipment and furniture and CT standards showed an improvement from 11.8% to 76.5 % and 40% to 80 % respectively. This implies there were significant association between pre and post intervention ,with (independent t-test, p-value was <.05).

Table 8. Comparisons of the Pre and Post – Intervention implementation of scale physical examination at CT in University of Gondar comprehensive specialize Hospital, January/2017.

	independent-test								
	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	567.998	.000	-17.804	550	.000	-40.68841	2.28531	-45.17742	-36.19940
Equal variances not assumed			-17.804	321.451	.000	-40.68841	2.28531	-45.18447	-36.19235

5. Discussion

In this capstone project, it found out that the number of met and unmet Central Triage standards. The main finding of this project is compliance with Ethiopian Hospital Reform implementation Guide Line standards for Central Triage increased from 40% to 80 %, Central triage room medical equipment and supply and furniture increased from 11.8% to 76.5 % and improving percentage of physical examination activities from 1.1% to 43.1%, scale measurement of vital sign from 1.4% to 47.5%, ,quick problem oriented system examining procedures from 4.3% to technology supported 40 % .and Improving the proportion of emergency patient linkage to Emergency Triage OPD from 1.4% to technology supported sorting patient 10%. Before implementation there was no established Central Triage protocol, medical equipment, supply and furniture and enough and trained health workers due to these there were poor physical examination at CT. After implementation established central triage protocol, fulfilled medical equipment, supply and furniture and increasing number of health workers based on EHRIG and hospital context and improved physical examination.

Similar study but emergency triage conducted in South Africa, core competencies required of the nurse during triage process taking vital signs 80% and system examination 20%.According to this study and when we compare ours with that of south Africa core competencies required of the nurse during triage process was less but we compare the hospital baseline /pre to post /intervention there is great improvement.(2) And The study showed that information was less accurate after implementation of the protocol (56.6% before versus 49.2% after). (10), standards for

In Adigrat General Hospital patient flow standards increased before implementation 23% to after implantation 85 %, (8, 13). According to this study and when we compare ours with that of Adigrat General Hospital slight improvement and also we compare the hospital baseline /pre to post /intervention there is also great improvement.

According to this finding, compliance of Ethiopian hospital reform implementation guide line standards for CT at University of Gondar Comprehensive Specialized Hospital, Northwest Ethiopia, 2016 increased .But in the pre – intervention period only four of the ten standards were met, and post – intervention period eight out of the ten operational standards were met and CT medical equipment and supply and furniture supported

EHRIG increased by 64.7% those were following the establishing Central Triage protocol , onsite training and discuss with different department heads to improve the implementation guide line as per the /EHRIG/.(8,14)

Establish central triage protocol is also other way that improves the central triage physical examination and plays great role to plan quality improvement interventions and delivery of quality services. As hospital leaders participating in the formation and strengthening of protocol establish, and this is also true in our study and improves physical examination as play great role in University of Gondar Comprehensive Specialized Hospital.

6. Conclusion and Recommendations

6.1 Conclusion:

The physical examination compliance was improved using the development and implementation resulted of:-

- Establish and availing organizational CT protocol and resources / medical equipment and supply and furniture , clinical staff, based on national standards and hospital context,
- Discussion and onsite training with different department head and CT health personnel about CT triage activities
- To accelerate scale-up from high-impact health system strengthening intervention other similar hospitals.
- Internal supportive supervision and monitoring and evaluation

6.2 Recommendations

For University of Gondar Comprehensive Specialized Hospital

- Continuous internal Supportive Supervision of CT health personals followed by on job training related to protocol can improve the implementation of physical examination.
- The hospital has to strengthen the further follow up and sustainability of the project
- CT professionals should actively participate in the implementation process of CT standards and protocol of the hospital.

- Clinical personnel accountability to implement the physical examination should be developed
- Hospitals should preferably near the Emergency Room (ER) to Central Triage in order to avoid unnecessary patient crowding and reduce patient waiting time.

For researchers

- ✓ Further strong study is needed

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8. Annexes

Annex 1: Information Sheet

Information Sheet and Consent Form Prepared for outpatient department head and Central Triage health professionals who are going to participate in research project, To Improve Physical Examination all records of patient who got Physical Examination procedure at Central Triage at Outpatient Department at University of Gondar Comprehensive Specialized Hospital., 2016.

Name of the principal Investigator: Amaru Bayeh

Name of Advisors: Professor Amsalu Feleke

Name of the organization: University of Gondar College of medicine and health science department of Health Service Management and Health Economics

Introduction

It is prepared to clear up the research project that you are asked to join by the investigators. The investigators include one final year Master of Hospital and Healthcare Administration Graduate student and one advisor from institute of public health and Health Service Management and Health Economics. Please listen carefully and ask any questions about the study before you agree to join. You may ask questions at any time after joining the study.

Purpose of Research Project

The purpose of this research project is to improve Physical Examining Procedure in the Central Triage at Outpatient Department University of Gondar Comprehensive Specialized Hospital.

Procedures

In order to accomplish the research project the study data will be obtained by inviting you to take part in the project. If you are willing to participate in this project, you need to understand and sign the consent form. Then you will be requested to respond for the questions you will be asked. You do not need to tell your name to the data collector and

all your responses and the results obtained will be kept confidentially by using coding system whereby no one will have access to your review.

Risks/ discomforts

By participating in this research project, you may feel some discomfort especially on wasting time about 5-10 minutes to each respond the record review otherwise no risk in participating in this project.

Benefit:

There is no any benefit from participating in this research but the output of the study will be beneficial for Improve Physical Examination and other services provided for all patients.

Confidentiality

The information collected from this research project will be kept confidential and Information about you that will be collected by this study will be stored in a file, without your name, but a code number assigned to it. And it will not be accessed by anyone except the principal investigator and will be kept locked with key.

Person to contact

If you want to talk to someone about this study, if you feel you have not been treated properly, if you are harmed by joining the study, if you have any question, please contact the following persons:

Principal investigator: Amaru Bayeh
Tel: 0918774886

Advisors:

Professor Amsalu Feleke

Annex 2: Consent form and questionnaire

Hello! How are you? My name is _____ I am here on the behalf of University of Gondar College of medicine and health science department of health service management and health economics in order to collect information related to Physical Examining Procedure and related root cause from responsible persons for Central Triage of University of Gondar Comprehensive Specialized Hospital. So, this is checklist prepared to assess related root cause of Physical Examining procedure at Central Triage University of Gondar Comprehensive Specialized Hospital.

The main aim of the study will be to provide basic information about improve proportion of Physical Examining Procedure at Central triage outpatient department. There is no any risk or discomfort that you will face by participating in the research except devoting of your time for responding to the interview. I strongly assure that your name and other identifier of you status will not be documented in the checklist and the information you provide us will be kept confidential and will not be used for anything other than research purpose. You are not forced to participate and you have the right to quit at any time in between. But we encourage you to respond to the interview and give us necessary information's. The record review will not take more than 10 minutes for each respondent. You can ask any question at any time and contact persons listed below.

Thank you!

The researcher explained me all the necessary information about the objective of the study. In addition, I have been informed as I have the right to not to participate and quit at any time. Based on the information, I confirm my agreement to collect Patient record review t data

Are you willing to participate in the study? Agree ☐ Disagree ☐

If the responsible person in the hospital agrees, thank him/her and proceed with the record review.

Record reviewer signature _____ Date ____/____/____

Format to be filled

No	record review	
01	Name of the health facility	
02	Date of record review	
03	Name of the record review	
05	Date	
06	Code number	

Checklist (English version) record review and Observation

Part1: Observation checklist on Base line assessment of Ethiopian hospital reform implementation guide line Central Triage standards at OPD of University of Gondar comprehensive specialized Hospital, 2016/2017.

Table2: Compliance of EHRIG Central Triage standards pre-post intervention in University of Gondar Comprehensive Specialized Hospital, Northwest Ethiopia, 2017

Sr.No.	Standards	pre-intervention		post-intervention	
		Met	Unmet	Met	Unmet
1	The hospital has a Central Triage				
2	Has established Central Triage protocol				
3	Has Central Triage partition room				
4	Has Central Triage clinical health personnel				
5	Has Central Triage trained clinical health personnel's				
6	Central Triage equipped with necessary equipment and supplies				
7	All patients (except laboring mothers, patients with an appointment for an outpatient clinic or admission) undergo triage				
8	Central Triage near to emergency triage				
9	Central Triage near to medical recorded room				
10	Has Central Triage enough patient waiting area				
total					
%					

Part 2: Observation checklist for medical instruments and supply and furniture availability versus policy supported of central triage at OPD of University of Gondar comprehensive specialized Hospital, 2016/2017.

Sr.No.	Item	Pre-Int		Post-Int	
		Yes	No	Yes	No
1	There is room furniture				
2	There is examination bed				
3	There is thermometer				
4	There is adult stethoscope				
5	There is adult sphygmomanometer				
6	There is adult weight scale				
7	There is electrocardiogram (ECG)				
8	There is pulse-oximetry				
9	There is wheelchair				
10	There is stretcher				
11	There is gloves 1box				
12	There is face masks/box/				
13	There is microphone				
14	There is antiseptic solution1botl				
15	There is wall clock(s)				
16	there is partition/screening of examination and treatment room				
17	there is established Central Triage protocol				
Total					

Part3: Patient record review checklist to measure client physical examination of the central triage at OPD University of Gondar comprehensive specialized Hospital, 2016/2017. Client code-----

Sr.n	Type of activities		physical examination				Remarks
			pre intervention		post intervention		
1	sex	female					
		male					
	age		<15	≥15	<15	≥15	
	Type of activities		Put (√) if done	Put (×) if not done	Put (√) if done	Put (×) if not done	Put (√) if done
2	Vital sign						
	Blood pressure measurement						
	Temperature measurement						
	pulse rate measurement						
	respiration rate measurement						
	total						
	status						
3	Quick problem oriented system examination						
	total						
	status						

Part4: Observation checklist emergency patient Linkage from CT to Emergency ROOM at OPD University of Gondar comprehensive specialized Hospital, 2016/2017. Client code-----

Sr.n	Type of activities	intervention		post intervention	
		Put (√) if done	Put (×) if not done	Put (√) if done	Put (×) if not done
1	emergency patient linkage to Emergency Triage				

የመዝገብ ምልክታ ቅፅ

ጤና ይስጥልኝ _____እባላለሁ። የጥናቱ አባል ነኝ እዚህ የተገኘሁት በጎንደር ዩኒቨርሲቲ የጤና ደህንነት አስተዳደርና ኢኮኖሚክስ ትምህርት ክፍል ወክሮ ደረጃዉን የጠበቀ የአካላት የምርመራ ስርትና ተያያዝ ያላቸዉን ችግሮች የተመለከተ መረጃ በቅድመ ልየታ ክፍል አሰራር ዙሪያ የሚመለከታቸዉን አካላት ላይ ለመሰብሰብ ነዉ። ስለዚህ ደረጃዉን የጠበቀ የአካላት የምርመራ ስርትና ተያያዝ ያላቸዉን ችግሮች ለመዳሰስ ይህ መጠይቅ ተዘጋጅቷል። የጥናቱ ዋና ደረጃዉን የጠበቀ የአካላት የምርመራ ስርትና ተያያዝ ያላቸዉን ችግሮች ላይ መሰረታዊ የሆነ መረጃን ለመስጠት ነዉ። ከእርስዎና ከሌሎች ድንበኞች የሚገኘዉ ትክክለኛ መረጃ ለደንበኞች የምንሰጠዉን አገልግሎት ለማስተካከልና ለማሻሻል እንዲሁም ወጤታማ የሆኑ አቅጣጫዎችን ለማስቀመጥ ከፍተኛ የሆነ ጥቅም ይኖረዋል።

ጥያቄዎቹን ለመመለስ ከሚወስዱት ሰዓት ወይም ጊዜ ውጭ በጥናቱ በመሳተፍዎ ሊደርስብዎ የሚችል ምንም ዓይነት ጉዳትም ሆነ ችግር የለም። በሚሰጡን መረጃ ላይ ስምም ሆነ ሌላ እርስዎን ሊገልፅ የሚችል ነገር እንደማይቀመጥና መረጃዉም በሚስጥር እንደሚያዝና ከዚህ ጥናት ውጭ ለምንም ዓይነት አገልግሎት እንደማይወል በጥብቅ አረጋግጥልዎታለሁ። በጥናቱ እናዲሳተፉ አይገደዱም እንዲሁም በማንኛዉም ሰዓት ጥናቱን አቋርጠዉ የመወጣት መብት አለወት ።ነገር ግን በጥናቱ እንዲሳተፉና አስፈላጊ የሆኑ መረጃዎችን እንዲሰጡን እንጠይቃለን። ምክታዉ ላአንድ ደንበኛ ከ10 ደቂቃ በላይ አይወስድም፤ ማንኛዉንም ዓይነት ጥያቄ በማንኛዉም ሰዓት መጠየቅ ይቻላል።

አመሰግናለሁ !!!

ተመራማሪዉ ስለጥናቱ ዓላማ ሁሉንም መረጃዎች ገልጾልኛል በተጨማሪም በጥናቱ ያለመሳተፍና ተሳትፎያንም በማንኛዉም ሰዓት የማቋረጥ መብት እንዳለኝ ተገንዶልኛል ። በተሰጠኝ መረጃ መሰረት በጥናቱ ለመሳተፍ መረጃዉን ለመሰብሰብ መስማማቴን አረጋግጣለሁ።

በጥናቱ ለመሳተፍ ተስማምተዋል? ተስማምቻለሁ ☐ አልተስማማሁ ☐

ድጋፊ.1. የ ምልክታ (በአማርኛ)

ክፍል1: መሰረታዊ መረጃ ዳሰሳ ጥናት በጎንደር ጠቅላላ ስፒሻልዊዝድ ሆስፒታል /በመመሪያው መሰረት 2009

ተ.ቁ.	መመሪያ	ከጠናት በፊት		ከትናት በኋላ	
		ያላሟላ	ያሟላ	ያላሟላ	ያሟላ
1	በሆስፒታሉ ሴንትራል ትሪያጅ አለ				
2	በሆስፒታሉ ደረጃውን ጠብቆ የተዘገጀ ሴንትራል ትሪያጅ ፕሮቶኮል አለ				
3	በሆስፒታሉ ሴንትራል ትሪያጅ ሁለት/የተጋረደ ክፍል አለ				
4	በሆስፒታሉ ተመደበ በቂ የጤና ባለሙያ አለ				
5	የሰለጠነ የሴንትራል ትሪያጅ ባለሙያ አለ				
6	የተሟላ የሴንትራል ትሪያጅ የህክምናና የቢሮ ቁሳቁስ አለ				
7	ከወላድ ተቀጠሮ ካላቸው በስተቀር ሁሉም ህመምተኞች በሴንትራል ትሪያጅ ያልፋሉ				
8	ማእከላዊ ትራያጅ ከድንገተኛ ትሪያጅ ጋር ቅርበት አለው?				
9	ማእከላዊ ትራያጅ ከካርድ ክፍል ቅርበት አለው?				
10	ማእከላዊ ትራያጅ በቂ የህመም ማቆ ቦታ አለ?				

ክፍል 2 : ለህመም ጥናት ዳሰሳ የሚያስፈልጉ ግብአቶች በጎንደር ጠቅላላ ስፒሻልዊዝድ ሆስፒታል /በመመሪያው መሰረት 2009

ተ.ቁ	አይነት	መጠን	የሚያስፈልግ በትንሹ	ከጠናት በፊት		ከትናት በኋላ	
				የለሌ	ያለ	የለሌ	ያለ
1	የቢሮ ቁሳቁስ						
2	የምመርመሪያ አልጋ						
3	ደም ግፊት መጠን መለኪያ						
4	የሙቀት መጠን መለኪያ						
5	የአዋቂ ማዳመጫ						
6	የአዋቂ የደም ግፊት መለኪያ						
7	የአዋቂ ክብደት መጠን መለኪያ						
8	ዘመናዊ የልብ መመርመሪያ						
9	ዊልቸር						
10	ስትሬቸር						
11	የእጅ ጓንት						
12	ጸለ-ተዋሲያን /ሳቫሎን/ ፈሳ						
13	የፊት መከላከያ/masks/						
14	የድምፅ መጉያ						
15	የግድግዳ ሰዓት						
16	የምርመራ ና የህክምና በመጋረጃ ተከፈል /ሁለት አለ						
17	ደረጃውን ጠብቆ የተዘገጀ ሴንትራል ትሪያጅ ፕሮቶኮል አለ						

ክፍል 3 : የመዝገብ ምልክታ (ደረጃውን የጠበቀ የህመማን ምርመራ በጎንደር ጠቅላላ ስፒሻላይዝድ ሆስፒታል 2009 እና መለያ የሚስጥር መለያቁጥር-----

ተ.ቁ	የተግባር አይነት		ምርመራ			
			ከጠናት በፊት		ከትናት በኋላ	
1	ዎጻ	ሴት				
		ወንድ				
	እድሜ		<15	≥15	<15	≥15
	የተግባር አይነት		የተመረመሩ ✓/ምልክት ይቀመጥ/	ያልተመረመሩ/× /ምልክት ይቀመጥ	የተመረመሩ ✓/ምልክት ይቀመጥ/	ያልተመረመሩ/ ×/ምልክት ይቀመጥ
2	ቫይታል ሳይን					
	የደምግፊት ልኬታ					
	የሙቀት መጠንልኬታ					
	የልብ ትርታ ልኬታ					
	የትንፋሽ ቅይደር ልኬታ					
3	ካለው ህምመ ጋር ያያዥነት ያለው የአካል ምርመራ					

ክፍል 4: ከሴንትራል ተሪያጅ ወደ ድንገተኛ ትክፍል የተላኩ ድንገተኛ ህመማኖች በጎንደር ጠቅላላ ስፒሻላይዝድ ሆስፒታል /በመመሪያው መሰረት 2009

ተ.ቁ	የተግባር አይነት	ከጠናት በፊት		ከትናት በኋላ	
		የተመረመሩ ✓/ምልክት ይቀመጥ/	ያልተመረመሩ/× /ምልክት ይቀመጥ	የተመረመሩ ✓/ምልክት ይቀመጥ/	ያልተመረመሩ/ ×/ምልክት ይቀመጥ
1	ወደድንገተኛ ትክፍል የተላኩ ድንገተኛ ህመማኖች				

Annex3 –Evaluation and monitoring indicators

The following indicators can be monitored on regular basis to assess the outcome of the implementation.

S.No.	Indicator	Formula Unit of	measure	Frequency of monitoring
	Compliance with Ethiopian hospital reform implementation guideline	number of EHRIG standards met/Total * 100	%	Quarterly
	CT physical examination	The number of appropriately examining patient in CT room from total sorting patient	%	Monthly
	Linkage of patient from CT To ER	The number of emergency patient link to ER room from the total patient who were examine C T	%	Monthly

Annex4: Assurance of Principal Investigator

The undersigned agrees to accept responsibility for the scientific ethical and technical conduct of the project and for provision of required progress reports as per terms and conditions of the Research Publications Office (in effect at the time of Grant is forwarded as the result of this application).

Name of the student: _____

Date. _____ Signature _____

Approval of the primary Advisor

Name of the primary advisor: _____

Date. _____ Signature _____